

WHAT IS CLAIMED IS:

1. A medical device, comprising:
an inflatable balloon having portions of different materials; and
a cutting element carried by the balloon.
2. The device of claim 1, wherein the materials have different distensibility.
3. The device of claim 1, wherein the materials have different distensibility along the longitudinal direction of the balloon.
4. The device of claim 1, wherein the portions extend along the longitudinal direction of the balloon.
5. The device of claim 1, wherein the cutting element is carried by the balloon over a portion of the balloon having a lower distensibility than another portion of the balloon.
6. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 1 mm along the length of the balloon over a predetermined pressure range.
7. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 0.8 mm along the length of the balloon over a predetermined pressure range.
8. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 0.5 mm along the length of the balloon over a predetermined pressure range.

9. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 0.3 mm along the length of the balloon over a predetermined pressure range.

10. The device of claim 1, wherein the balloon is co-extruded.

11. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 10% along the length of the balloon over a predetermined pressure range.

12. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 7% along the length of the balloon over a predetermined pressure range.

13. The device of claim 1, wherein the balloon is formed with a portion having a distensibility less than about 5% along the length of the balloon over a predetermined pressure range.

14. A medical device, comprising:
a catheter;
an inflatable balloon carried by the catheter, the balloon formed having a striped portion with a lower distensibility than another portion of the balloon; and
a cutting element carried by the balloon.

15. The medical device of claim 14, wherein the balloon is formed having a plurality of striped portions.

16. The medical device of claim 15, wherein the number of striped portions is greater than the number of cutting elements carried by the balloon.

17. The medical device of claim 15, wherein the striped portions are equally spaced around the circumference of the balloon.

18. The medical device of claim 14, wherein the striped portion extends parallel to the longitudinal axis of the balloon.

19. The medical device of claim 14, wherein the striped portion extends helically about the longitudinal axis of the balloon.

20. The device of claim 14, wherein the balloon is formed by co-extrusion.

21. The device of claim 14, wherein the balloon is a multi-layered balloon.

22. The device of claim 14, wherein the striped portion extends continuously along the length of the balloon.

23. The device of claim 14, wherein the striped portion has a distensibility less than about 1 mm along the length of the balloon over a predetermined pressure range.

24. The device of claim 14, wherein the striped portion has a distensibility less than about 0.8 mm along the length of the balloon over a predetermined pressure range.

25. The device of claim 14, wherein the striped portion has a distensibility less than about 0.5 mm along the length of the balloon over a predetermined pressure range.

26. The device of claim 14, wherein the striped portion has a distensibility less than about 0.3 mm along the length of the balloon over a predetermined pressure range.

27. The device of claim 14, wherein the striped portion has a distensibility less than about 10% along the length of the balloon over a predetermined pressure range.

28. The device of claim 14, wherein the striped portion has a distensibility less than about 7% along the length of the balloon over a predetermined pressure range.

29. The device of claim 14, wherein the striped portion has a distensibility less than about 5% along the length of the balloon over a predetermined pressure range.

30. The device of claim 14, wherein the striped portion comprises a liquid crystal polymer.

31. The device of claim 14, wherein the striped portion comprises a colorant.

32. The device of claim 14, wherein the balloon comprises an inorganic additive.

33. The device of claim 14, wherein the striped portion extends over a portion of the length of the balloon.

34. The device of claim 14, wherein the striped portion extends over substantially the entire length of the balloon.

35. The device of claim 14, wherein the cutting element is carried by the balloon over the striped portion.

36. The device of claim 35, wherein the cutting element is carried by the balloon centered over the striped portion.

37. A method of making a medical device, the method comprising:
forming a tube having a striped portion with a lower distensibility than another portion of the tube;
forming an inflatable balloon from the tube; and
attaching a cutting element to the balloon.

38. The method of claim 37, wherein the tube is formed by co-extrusion.

39. The method of claim 37, wherein the tube is formed by lamination.

40. The method of claim 37, comprising attaching the cutting element to the balloon with an adhesive.

41. The method of claim 37, comprising attaching the cutting element to the balloon over the striped portion.

42. The method of claim 37, further comprising folding a portion of the balloon over the cutting element.

43. A medical device, formed by the method of claim 37.

44. An extrusion apparatus, comprising:

a first disc having a first inlet and a first outlet in fluid communication with the first inlet, the first disc configured to permit flow of a first material therethrough; and

a second disc having a second inlet, a second outlet in fluid communication with the second inlet, and a plurality of passageways in fluid communication with the second inlet and the second outlet, the second disc configured to permit flow of a second material different than the first material therethrough,

wherein the first and second discs are configured to form a member having discrete portions of the second material separated by the first material.

45. The apparatus of claim 44, wherein the plurality of passageways is in fluid communication with the first outlet.

46. The apparatus of claim 44, further comprising a third disc having a third inlet and a third outlet configured to permit flow of the first material therethrough.

47. The apparatus of claim 44, wherein the second disc is between the first and third discs.

48. The apparatus of claim 44, wherein the first and second materials comprise a polymer.

49. The apparatus of claim 44, wherein the apparatus is a disc head extrusion apparatus.

50. The apparatus of claim 44, wherein the apparatus is configured to be used in the fabrication of a polymer tube having a striped portion.

51. A method of extrusion, the method comprising:

flowing a first material through a first disc having a first inlet and a first outlet in fluid communication with the first inlet;

flowing a second material different than the first material through a second disc having a second inlet, a second outlet in fluid communication with the second inlet, and a plurality of passageways in fluid communication with the second inlet and the second outlet; and

forming a member having discrete portions comprising the second material separated by the first material.

52. The method of claim 51, further comprising flowing the first material through a third disc having a third inlet and a third outlet in fluid communication with the third inlet.

53. The method of claim 51, further comprising rotating the member about the longitudinal axis of the member.

54. The method of claim 51, wherein the discrete portions extend along the longitudinal axis of the member.

55. The method of claim 51, wherein the member is a polymer tube.

56. A medical device, comprising:

an inflatable balloon having portions of different materials,
wherein at least one portion extends helically about the longitudinal direction of the balloon.

57. The device of claim 55, wherein the materials have different distensibility.
58. The device of claim 55, wherein the balloon comprises two portions of different material, and both portions extend helically about the longitudinal direction of the balloon.
59. The device of claim 55, at least one portion includes a liquid crystal polymer.
60. The device of claim 55, wherein the balloon is co-extruded.
61. The device of claim 55, wherein at least two portions include a material of the same composition.
62. A medical device, comprising:
an inflatable balloon having a discrete portion of material extending helically about the longitudinal direction of the balloon.
63. The device of claim 62, wherein the discrete portion has a chemical composition different than another portion of the balloon.
64. The device of claim 62, wherein the discrete portion includes a liquid crystal polymer.
65. The device of claim 62, wherein the discrete portion has a higher flexural modulus than another portion of the balloon.
66. The device of claim 62, wherein the balloon has a first portion with a first density of the discrete portion higher than a second density of the discrete portion of a second portion of the balloon.
67. The device of claim 66, wherein the first portion is a tapered portion of the balloon.

68. The device of claim 66, wherein the first portion is a sleeve portion of the balloon.
69. A method of making a medical device, the method comprising:
forming a tube having a discrete portion of material extending helically about the longitudinal direction of the tube; and
forming an inflatable balloon from the tube.
70. The method of claim 69, wherein the tube is formed by co-extrusion.
71. The method of claim 69, wherein the tube is formed by lamination.
72. The method of claim 69, wherein the inflatable balloon is formed by blow molding.